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ABSTRACT

Since July 1978, RMC Research Corporation has been conducting a study concerned with several aspects of the Title I Evaluation and Reporting System (TIERS). Phases I and II included examination of technical and procedural issues, development of system materials, and assessment of state evaluation reports. Phase III was intended to be an operational test of the system using data reported for the 1979-80 school year. The project-level data included in the state performance reports, termed "project vectors," include information on project characteristics, evaluation practices, mean gains, and posttest scores for individual Title I projects at grades 2, 6, and 10. This report summarizes the major results of Phase III to date. In the first section, the data file and the results of the edit of the project vectors are described. Summary tabulations that describe Title I projects and their evaluation practices are presented. In the last section, preliminary results from an examination of differences in mean gains across testing cycles are described. (Author/BW)

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Results from the Analyses of Title I Project Vector Data

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RESULTS FROM THE ANALYSIS OF TITLE I PROJECT VECTOR DATA

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The Title I Evaluation and Reporting System (TIERS) was mandated by Congress in the Education Amendments of 1974 and 1978 to provide information to local, state, and federal policy-makers on the impact of Title I programs. The standards and guidelines defining the TIERS are intended to produce technically sound results at the local level which can be aggregated to the state and federal levels.

Since July 1978 RMC has been conducting a study funded by the Office of Planning, Budget, and Evaluation (OPBE) within the U.S. Department of Education. The study has been concerned with several aspects of the TIERS. Major activities undertaken during Phases I and II have included: examination of technical and procedural issues affecting the system, development and revision of system materials and forms, and assessment of State Evaluation Reports. Phase III of the study was intended to be an operational test of the system using data reported for the 1979-80 school year. This set of data is the first to be collected nationwide since the final regulations concerning TIERS were issued in January 1981.

As part of the Phase III study, RMC has been responsible for organizing, editing, and analyzing the project-level data included in Section D, Part V of the State Performance Reports. These data, which have been termed "project vectors," include information on project characteristics, evaluation practices, mean gains, and posttest scores for individual Title I projects at grades 2, 6, and 10. For the 1979-80 school year, SEAs provided information on more than 26,000 Title I projects nationwide, covering programs administered by the 50 states, the District of Columbia, the Bureau of Indian Affairs, Guam, Puerto Rico, and the Virgin Islands.

The purpose of this paper is to summarize the major results of our study to date. In the next section, we describe the data file and the results of the edit of the project vectors. We then present some of the summary tabulations that describe Title I projects and their evaluation practices. In the last section, we describe the preliminary results from our examination of differences in mean gains across testing cycles.

Organization and Edit of the Project Vectors

As was indicated above, the project vectors contain information on project characteristics, evaluation practices, and project impacts. The project characteristics include items on: subject matter covered (either reading, language arts, or mathematics), project setting (regular classroom, pull-out, lab, etc.), grade level, average hours per week of instruction, total hours of instruction, the student-instructor ratio, and project size as indicated by the membership count. The items concerning evaluation practices include: the evaluation model (either norm-referenced, comparison group, or regression), the testing interval (either spring-spring, fall-fall, or fall-spring), and the posttest battery, edition, and level. Finally, the mean gain score and posttest score are reported along with the number of students with pretest and posttest scores. The mean gain scores and posttest scores are reported in Normal Curve Equivalent (NCE) units.

Over the period from April to November 1981, RMC received usable project vector data for 55 SEAs, covering all 50 states, the District of Columbia, the Bureau of Indian Affairs (BIA), Guam, Puerto Rico, and the Virgin Islands. A total of 27,439 project vectors are included in the final file.

The data sets for the states that reported their project vectors in printed format were manually edited and entered on a computer tape prior to being included in the data file. The editing included (1) modification of coding, where necessary, to assure uniformity across SEAs, and

(2) elimination of ambiguities in the printed material. After editing, the data were sent to a vendor for data entry and verification. As a final check, systematic samples of 1% of the vectors from each state were drawn from the data received from the vendor and checked against the printed listings.

Computer edit checks were conducted on the project vector files that had been created after the data entry process had been completed. Two types of edit analyses were conducted. In the first type, variable values on each project vector were checked to verify that they were within range and internally consistent. Output from this analysis consisted of both (1) tabulations of the number of vectors with variable values missing and out of range, and (2) listings of the project vectors with values out of range. From the above analyses we compiled lists of SEAs and LEAs with data that were questionable because of anomalies, deletions, or contradictions. We attempted to resolve these problems by contacting staff in the associated TACs. The results of the analyses and follow-up activities were tabulated and the project data were corrected, deleted, or left as they were, depending on which appeared to be the appropriate course of action.

The second type of edit analysis, which was performed after the above modifications were completed, consisted of comparisons of state-level aggregates computed from the project vectors with those reported by the SEAs in Sections A1 and A2 of Part V of the State Performance Reports. The comparisons were conducted on the following quantities: membership, number of students with pretest and posttest scores, mean posttest NCE score, and mean NCE gain. Output from this analysis consisted of tabulations of summary statistics concerning the differences and listings of the aggregate quantities and differences.

Results from the Initial Edit Check

In the initial edit analysis, each project vector was checked for 23 conditions defined by variables being either out of range or internally inconsistent. Of the 27,513 project vectors on the original file, 31% were flagged on at least one condition. However, no single condition had a particularly high percent of vectors flagged.

A relatively high proportion of projects, 4.6% of the total, were flagged for a condition where the posttest was found to be inconsistent with the test interval. The guidelines for the TIERS specify that tests should only be used at time points when empirical norms are available for the test. Since the Comprehensive Test of Basic Skills, the Peabody Individual Achievement Test, and the 1969 edition of the Sequential Tests of Educational Progress have empirical norms only for the spring, these tests should have been used only in spring-spring testing, according to the TIERS guidelines. Therefore, the 1,269 projects that were flagged reportedly used one of these batteries at a fall testing. The effect of including these projects in the calculation of the mean gain is discussed in a later section.

The only other result of particular note is that indicators for the edition and level of the posttest were missing for a substantial number of vectors. The test edition was missing for 18% of the vectors and the test level was missing on 58% of the vectors. The high rate of missing data arose because edition and level were not reported at all for some SEAs. In particular, eight SEAs did not report the posttest edition and 25 SEAs did not report the posttest level.

As a result of the edit checks, 100 project vectors were deleted from the files either because the subject code was out of range, the grade level was out of range, or both membership and the number of students with pre- and posttest scores had missing values. Additional modifications were made to handle outlying values of specific variables,

inconsistencies, and violations of evaluation guidelines. The deletions and modifications generally affected few projects within any SEA and the projects affected were small in size.

Results from the Second Edit Check

The purpose of the second edit check was to compare the aggregate statistics from the project vectors with the aggregate statistics reported by SEAs in a different section of the State Performance Reports. For the most part, the two sets of aggregate statistics were quite close. For example, of the 635 cases defined by combinations of SEA, grade level, subject matter, and time of testing, more than 50% had a difference in gain between the two sets of aggregates of less than .2 NCEs, and 80% had a gain difference of less than 1.2 NCEs.

It is important to note, however, that some of the largest discrepancies, and cases where discrepancies could not be calculated because of missing data, occurred for the largest SEAs, including California, New York, and New Jersey. California reported the project vector data only for a set of Title I projects that volunteered the data. As a result, there are large discrepancies in the number of students represented by California in the two data sets. For example, in grade 2 reading, California reported gains for about 37,000 students in the SEA aggregate, but only about 900 students are represented on their reported project vectors. For New York, RMC received only data for math projects, although the state aggregates indicated that New York had about 27,000 students in reading projects at both grades 2 and 6. There were also large discrepancies between the project vector data that were received and the reported state aggregates.

For a few SEAs, even where discrepancies were small, there had been a major loss in data on both the state aggregates and the project vectors. For example, one SEA had edited their gain data to delete projects where the pretest had been used to select program participants.

About 3,000 out of 3,500 students were excluded from the grade 2 reading gains in the full year evaluation as a result.

In conclusion, the SEA aggregate and project vector data corresponded quite closely for the most part. However, the project vector data have several major gaps in coverage. To the extent that the missing data are different from what is on the project vector file, the results of our tabulations and analyses will not be representative of the entire nation.

Summary Tabulations

The tabulations presented in this section were generated from the edited project vector file. Data on the file were weighted in the tabulations to account for sampling. A weight of one was assigned to each project vector for SEAs that did not sample. A weight of three was assigned to each project vector for SEAs that sampled one-third of their projects. In a few cases where SEAs sampled one-third of most of their projects but included one or more projects with certainty, the project vectors that were sampled were assigned a weight of three, and the others were assigned a weight of one.

No attempt was made to weight the data to account for missing values. As indicated in the last section, due to incomplete submissions and editing, the results of the tabulations do not represent complete coverage of Title I projects.

Descriptions of Title I Projects

In this section we present some descriptive data about Title I projects as reported in the project vectors. Project membership, setting, hours per week, and student-teacher ratios are described.

Membership. Title I projects for the school year 1979-80 in grades 2, 6, and 10 served a wide number of students. The data on project membership are shown in Table 1 for reading and math projects in grades 2, 6, and 10. The table entries reflect the percentage of total number of projects in each of six size groupings with the percentage in each subject matter/grade combinations.

Table 1
Distribution of Title I Projects on Project Membership
by Subject and Grade

Subj/Grade	N[a]	Project Membership Category					
		1-5	6-10	11-20	21-50	51-100	100+
		Percentage Distribution					
Reading/2	12,604 (4)	25	21	22	19	8	6
Reading/6	10,036 (5)	31	22	19	16	7	5
Reading/10	1,612 (8)	29	22	21	17	7	4
Math/2	5,781 (6)	31	21	18	18	7	5
Math/6	5,899 (6)	31	22	20	16	7	5
Math/10	764 (6)	34	18	18	19	7	4

[a]N reflects total number of projects for which this information was reported; the percentages in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

It is clear from the table that the focus of Title I is at the elementary grades. There are about 6 to 8 times as many reading projects in grades 2 and 6 as there are in grade 10; and there are nearly 8 times math projects at the elementary level than at the secondary level. Most projects were reported to be quite small. Roughly half of all projects reported serving 10 or fewer students. At the same time, however, data not reported here indicate that about 40% of the Title I students are to be found in the relatively few large projects that had 100 students or more.

Instructional Setting. The instructional settings used in Title I projects are shown in Table 2.

Table 2
Distribution of Title I Projects on Project Setting
by Subject and Grade

		Project Setting Category						
Subj/Grade	N[a]	Regular Class	Pull-Out	LAB	RC+ PO	RC+ LAB	PO+ LAB	Other
		Percentage Distribution						
Reading/2	12,999 (1)	9	77	3	7	1	2	1
Reading/6	10,372 (2)	9	75	4	6	1	3	1
Reading/10	1,706 (2)	21	57	7	4	4	2	5
Math/2	6,003 (2)	14	68	3	10	2	2	2
Math/6	6,106 (2)	12	69	4	9	2	2	2
Math/10	783 (4)	21	57	4	8	4	2	4

[a]N reflects total number of projects for which this information was reported; the percentages in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

The results in Table 2 show that the majority of Title I projects are pull-out programs where most Title I-funded instruction occurs outside the regular classroom. This is especially the case at the elementary levels where more than 75% of the projects are in the pull-out category in reading and where 68% of the math projects are pull-out. The regular classroom setting is somewhat more prevalent at grade 10--around 20-21%, but pull-out still predominates. The combination of regular classroom plus pull-out is the next most prevalent general setting.

When viewed in terms of the number of students, the predominance of pull-out instruction is somewhat less, however. Table 3 displays the percentage of students receiving services in various settings. An inspection of Table 3 reveals that, at the student level, the relative prevalence of regular class as the instructional setting increases as compared to the case where project is the analytic unit. Apparently, larger projects are somewhat more likely to use regular class as the instructional setting. Nevertheless, pull-out remains the most frequent setting.

Table 3
Distribution of Title I Students on Project Settings
by Subject and Grade

		Project Setting Category						
Subj/Grade	N[a]	Regular Class	Pull-Out	LAB	RC+ PO	RC+ LAB	PO+ LAB	Other
		Percentage Distribution						
Reading/2	329,224 (2)	12	69	3	8	3	3	2
Reading/6	235,583 (1)	13	62	7	8	3	5	2
Reading/10	33,252 (2)	30	41	7	5	6	3	9
Math/2	130,792 (4)	19	53	4	10	4	2	7
Math/6	137,502 (2)	14	58	7	8	5	2	6
Math/10	13,479 (3)	23	42	3	12	5	3	12

[a]N reflects total number of students for which this information was reported; the percentages in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of students for which data were missing.

Hours of Instruction. Table 4 describes Title I projects on the average number of hours per week of instruction that a typical student received. The percentages of Title I projects at each of four categories of the Hours/Week variable are shown. As can be seen in the table, the bulk of grade 2 and 6 projects offer between 1 and 3 hours of instruction per week across subject matter areas. Most secondary school projects, on the other hand, provide more than 3 hours per week of instruction on the average, perhaps reflecting greater need on the part of students at the secondary level. The average total hours of instruction per year (not shown in the table) follows a similar pattern, with the average across subject areas being about 90 hours at the elementary level and increasing to 110 hours at grade 10.

Table 4
Distribution of Title I Projects on Hours per Week of Instruction by Subject and Grade

Subj/Grade	N[a]	Hours/Week of Instruction Category				
		≤1	1-2	2-3	3-4	>4
		Percentage Distribution				
Reading/2	12,400 (6)	8	27	42	13	10
Reading/6	9,794 (7)	7	24	37	19	13
Reading/10	1,583 (9)	3	16	21	24	36
Math/2	5,304 (13)	11	28	38	13	11
Math/6	5,359 (14)	9	27	34	17	13
Math/10	671 (18)	11	19	19	20	30

[a]N refers to the total number of projects for which this information was reported; the percentage in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

Student-Teacher Ratio. Table 5 displays the student-teacher ratios reported for Title I projects. The percentage of projects at each of seven categories of student-to-teacher ratios is given in the table. The data shown in the table indicate that the vast majority of projects operate with 10 or fewer students for each teacher. At the elementary level, about 80% of the reading and 75% to 80% of the math projects exhibit six or fewer students per teacher. At the secondary level, there are a few more projects in the 10 to 15 and more than 15 students per teacher categories, but, still, low student-teacher ratios are the rule.

Table 5
Distribution of Title I Projects on Student-Teacher Ratio
by Subject and Grade

Subj/Grade	N[a]	Student-to-Teacher Ratio Category						
		1	1-2	2-4	4-6	6-10	10-15	>15
		Percentage Distribution						
Reading/2	12,979 (1)	12	12	33	26	13	4	1
Reading/6	10,355 (2)	14	11	30	24	15	4	2
Reading/10	1,697 (3)	12	9	25	21	22	8	3
Math/2	5,653 (8)	14	13	32	21	12	7	2
Math/6	5,701 (9)	14	12	28	21	16	7	2
Math/10	627 (23)	17	6	20	18	28	9	3

[a]N refers to the total number of projects for which this information was reported; the percentage in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

Description of Evaluation Practices for Title I

The TIERS implementation has gone a long way toward altering and, it is to be hoped, improving the nature of educational evaluation at the SEA and LEA levels. At this juncture we present some descriptive data on the nature of evaluations conducted through the TIERS. We present data concerning the evaluation models used, the testing cycles, the

tests selected by LEAs, the incidence of out-of-level testing, and the attrition rates.[1]

Use of Evaluation Models. Table 6 displays the relative prevalence of each of the "legal" evaluation models as reported in the 1979-80 TIERS data. TIERS allows three evaluation models--the norm-referenced model, the comparison group model, and the regression model. Each of the so-called models allows the use of either a nationally standardized test or a local (non-normed) test. As can be seen in Table 6, there exists an overwhelming national preference for the norm-referenced model. Across subject matter areas and grade levels, the norm-referenced model accounts for 99% of all projects reporting; only 24 of these projects used a locally developed test rather than a nationally standardized test. It is safe to conclude that overall the norm-referenced model is the model of choice for the vast majority of SEAs and LEAs. Although not shown in the table, between 95% and 99% of Title I students are in projects using the norm-referenced model.

Table 6
Distribution of Title I Projects on Evaluation Model
by Subject and Grade

Subj/Grade	N[a]	Evaluation Model		
		Norm-Ref.	Comp. Group	Regression
		Percentage Distribution		
Reading/2	12,527 (5)	99.2	0.1	0.6
Reading/6	10,109 (4)	98.9	0.2	0.8
Reading/10	1,635 (6)	99.6	0.2	0.2
Math/2	5,673 (7)	98.6	0.1	1.2
Math/6	5,837 (7)	98.5	0.1	1.3
Math/10	733 (10)	98.8	0.1	1.1

[a]N reflects total number of projects for which this information was reported; the percentages in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

[1]The attrition rate was not an item reported directly on the project vectors. We estimated it for each project as 100 * (MEM-N)/MEM, where
MEM = the reported project membership count, and
N = the reported number of students with pretest and posttest scores.

Testing Intervals. Table 7 presents data on the testing interval used in Title I projects. The data shown in the table indicates that about 75% to 80% of all projects use the fall-spring schedule of testing. Most other projects use a spring-to-spring schedule, with the fall-to-fall format being quite rare.

Table 7
Distribution of Title I Projects on Testing Interval
by Subject and Grade

Subj/Grade	N[a]	Testing Interval Category			
		Spring-Spring	Fall-Fall	Fall-Spring	Other
		Percentage Distribution			
Reading/2	12,524 (5)	17	2	81	0
Reading/6	10,109 (4)	18	2	79	9
Reading/10	1,635 (6)	15	1	83	1
Math/2	5,673 (7)	19	4	77	0
Math/6	5,837 (7)	20	4	75	0
Math/10	753 (10)	14	7	78	1

[a]N reflects total number of projects for which this information was reported; the percentages in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

Use of Various Achievement Tests. As shown in Table 6, the norm-referenced model using nationally normed tests dominates the Title I evaluation scene. Table 8 presents the distribution of achievement tests used for the posttest in Title I evaluations. The data show that the Gates is the most frequently used test in reading evaluations and that the California Achievement Test (CAT) was the most widely used in math evaluations. The most widely used test batteries (math and reading) are the CAT, the Metropolitan (MAT), the SRA, and the Stanford (SAT). Virtually no use is made of locally-derived tests (reflecting the rare incidence of the "no-normed" option in the system).

Table 8
Distribution of Title I Projects on Test Battery
Used for the Posttest by Subject and Grade

Test	Grade:	Reading 2	Reading 6	Reading 10	Math 2	Math 6	Math 10
N[a]		12,242 (7)	9,919 (6)	1,562 (10)	5,418 (11)	5,630 (10)	635 (22)
		Percentage Distribution					
CAT		21	20	23	28	26	33
CTBS		4	5	5	5	7	8
GATES		23	21	28	0	0	0
ITBS		5	7	2	8	11	4
MAT		13	12	8	15	14	9
SRA		11	12	12	14	13	15
SAT		11	10	6	15	14	9
SDMT		0	0	0	9	10	12
SDRT		7	7	7	0	0	0
WRAT		1	1	2	1	1	4
WOOD		2	2	2	0	0	0
OTHER COM		2	2	6	4	5	8
LOCAL		0	0	0	0	0	0

[a]N reflects total number of projects for which this information was reported; the percentages in each column add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

Test Legend:

CAT = California Achievement Test
CTBS = Comprehensive Test of Basic Skills
GATES = Gates-MacGinitie Reading Test
ITBS = Iowa Test of Basic Skills
MAT = Metropolitan Achievement Test
SRA = SRA Achievement Series
SAT = Stanford Achievement Test
SDMT = Stanford Diagnostic Mathematics Test
SDRT = Stanford Diagnostic Reading Test
WRAT = Wide Range Achievement Test
WOOD = Woodcock Reading Mastery Test
OTHER COM = Some other commercially developed test
LOCAL = A locally developed test

At the student level (data not shown), as opposed to the project level, the California Achievement Test had the highest pervalence of use. At least 30% of Title I students had been administered the CAT in every subject-grade level category. The most widely used tests remained the same as those listed in the prior paragraph.

Out-of-Level Testing. The Title I system has long been concerned with the issue of in- versus out-of-level testing because of the problems arising from floor effects. Floor effects result from using test levels too difficult for many students. Table 9 presents information on the relative frequency of in- and out-of-level testing for the posttest. The table reveals that more than two-thirds of the projects reporting this information used tests that were at the level specified by the various test publishers. However, the picture of an overwhelming use of in-level tests may be somewhat distorted since fewer than half of the total projects reported this information.

Table 9
Distribution of Title I Projects on the Level of the Posttest by Subject and Grade

Subj/Grade	N[a]	Test Level	
		In	Out
		Percentage Distribution	
Reading/2	7,182 (45)	70	30
Reading/6	5,762 (45)	73	27
Reading/10	845 (52)	63	37
Math/2	3,108 (49)	72	28
Math/6	3,062 (51)	72	28
Math/10	265 (67)	71	29

[a]N reflects total number of projects for which this information was reported; the percentages in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

Attrition Rate. The attrition rate indicates the percent of student participants in a project whose gain scores are included in the evaluation. When a project sustains a high attrition rate, then it is open to the possibility that its mean gain is not representative of the entire group of project participants. (See Kaskowitz & Friendly (1980) for a detailed discussion of the effect of attrition on Title I evaluations.)

Although the attrition rate was not reported directly in the project vector data, an estimate was derived from the reported count of project membership and the reported number of students with pre- and posttest scores (n), as described earlier. This estimate may tend to be low, since many projects reported identical values for membership and n, apparently when the membership counts were not available. (For one state where membership and n were identical for all projects, the attrition rate was set to be missing.)

Table 10 shows the distribution of Title I projects on attrition broken out by subject and grade. In all cases, at least 40% of the projects had no attrition at all. However, about 15% of the projects in grades 2 and 6 and about 30% of the projects at grade 10 had attrition rates in excess of 33%, the rate that has been used in the past as a criterion for the possibility of a large bias due to attrition. The attrition rates for projects at grades 2 and 6 averaged about 16% with a standard deviation of about 22%. It is interesting to note that Kaskowitz and Friendly (1980) had estimated project attrition rates to be about 17% with a standard deviation of 19% based on data from the Sustaining Effects Study. In any event, it appears that many projects at the higher levels are plagued by high attrition rates and that, at least at the individual project level, the estimates of gain are susceptible to bias due to attrition.

Table 10
Distribution of Title I Projects on Attrition Rate
by Subject and Grade

Subj/Grade	N[a]	Attrition Rate Category				
		0	0-10	10-20	20-33.3	>33.3
		Percentage Distribution				
Reading/2	12,752 (3)	43	12	18	11	16
Reading/6	10,179 (3)	49	13	15	9	14
Reading/10	1,674 (4)	39	7	14	13	27
Math/2	5,876 (4)	44	11	16	11	18
Math/6	6,015 (4)	49	11	16	9	15
Math/10	785 (4)	38	9	11	9	32

[a]N reflects total number of projects for which this information was reported; the percentages in each row add to 100, subject to rounding error. The numbers in parentheses indicate the percent of projects for which data were missing.

Preliminary Results Concerning Differences in Gains Across Testing Cycles

One focus of our technical analyses in Phase III is on assessing the factors that contributed to the differences in mean NCE gains reported across testing cycles. Table 11 shows the mean gains as calculated from the reported state aggregates and the project vector data for reading and math at grade levels 2 and 6. The reported state aggregates were taken from sections A1 and A2 of Part V of the State Performance Reports and are not necessarily consistent with the data reported on the project vectors. For several large states, for example, project vector data were reported for a small nonrepresentative group of Title I projects. Discrepancies between the two sets of data also arose because the project vector data were edited by RMC to delete data where there were inconsistencies or violations of evaluation guidelines. For example, some projects in one subject matter area reported use of a test that covers a different area. The heaviest editing, however, was necessary for projects that reported using a test battery at a time point

where empirical norms were not available. Of the 27,439 project vectors on the file, 1,226 or about 4.5% fit in this category. The gains for these projects were deleted from the project vector file.

For grade 2 reading and math, the difference in mean gain between the two testing cycles are 8.4 NCEs and 9.4 NCEs for the state aggregate data and 6.1 NCEs and 5.4 NCEs for the project vector data. The corresponding differences for grade 6 are substantially smaller: 2.7 NCEs in reading for both the state aggregate data and the project vector data and, in math, 3.8 NCEs for the state aggregate data and 3.3 NCEs for the project vector data.

Table 11
Mean NCE Gains from the State Aggregate and Project Vector Files by Subject Matter, Grade, and Testing Cycle

Subject Matter	Grade	Testing Cycle	State Aggregates* Number Tested	State Aggregates* Mean Gain	Project Vector Number Tested	Project Vector Mean Gain
Reading	2	Full year	63,109	1.0	35,747	2.3
		Fall-Spring	208,101	9.4	147,657	8.4
		Difference		8.4		6.1
	6	Full Year	75,396	3.3	34,781	3.1
		Fall-Spring	147,247	6.0	101,462	5.8
		Difference		2.7		2.7
Math	2	Full year	39,008	1.1	15,622	4.3
		Fall-Spring	85,134	10.5	55,274	9.7
		Difference		9.4		5.4
	6	Full year	50,496	3.9	18,992	4.0
		Fall-Spring	81,059	7.7	58,545	7.3
		Difference		3.8		3.3

Note: Estimates are for the 50 states and the District of Columbia. The aggregate estimates are unweighted and therefore do not account for sampling of projects within SEAs. Due to editing and incomplete submissions, the estimates are biased to an unknown degree from lack of total coverage of Title I projects.

*These data were taken from The Annual Evaluation Report: U.S. Department of Education Programs (U.S. Department of Education, 1981).

These differences across testing cycles may have arisen from any combination of factors:

- confounding of testing cycle with other variables;
- differential attrition;
- changes in actual achievement gains;
- artifacts produced by the evaluation design;
- differential motivational factors.

(See Kaskowitz (1981), Klibanoff & Haggart (1981), and Hammond & Frechtling (1979) for discussions of the factors related to differences in gain across different time intervals.)

Ascribing the differences to specific factors is a formidable task which we have just begun. Presented below is a summary of our results to date.

Potential Confounding with SEAs

SEAs vary widely in encouraging and supporting correct evaluation and reporting practices and in the degree to which they edit project data. Furthermore, there may be real differences in project impacts across SEAs. Therefore, it is possible that differences across testing cycles may merely be related to confounding of SEA differences.

There is evidence of confounding explaining at least some of the differences observed. For example, consider the statistics from the state aggregates for grade 2 math as shown in Table 11. The difference between the mean gains for the two testing cycles was 9.4 NCEs. However, 52% of the students in the full-year testing cycle, and 22% of the students in the fall-spring cycle came from California Title I projects. These projects reported mean gains of -3.2 NCEs and 15.7 NCEs for the full-year and fall-spring cycles respectively. For California alone, the difference across cycles was almost 19 NCEs. If California

is excluded from the computations, then the full-year cycle now has a mean gain of 5.9 NCEs while the fall-spring cycle has a mean gain of 9.0 NCEs. Therefore, the difference across cycles is still evident, but it is shrunk by one-third from 9.4 NCEs to 3.1 NCes. Of course, the question remains as to why projects in California experienced the extraordinary differences in gains across cycles, and why the remaining differences still exist.

Evidence that the differences across testing cycles is not merely due to confounding with SEAs is shown in Table 12, which tabulates the number and percent of states in which the mean fall-spring gain was greater than the mean full-year gain. These tabulations used the state aggregate data file. In all cases shown, the overwhelming percent of states exhibited the same pattern as found nationwide.

Table 12
Comparison of State NCE Gains Across Testing Cycles

Subject Matter	Grade	Total No. of States	States with means for both testing cycles: n	No. with Fall-Spr. > Full Year	% with Fall-Spr. > Full Year
Reading	2	51	43	39	91
	6	51	42	36	86
Math	2	51	40	33	83
	6	51	41	34	83

Note: Tabulations use the aggregate data for the 50 states and the District of Columbia provided to RMC by the U.S. Department of Education.

Potential Confounding with Model

Table 13 shows the mean NCE gains broken out by model, subject matter, grade level, and testing cycle as computed from the project vectors. As indicated earlier, very few students were in projects that used the comparison or regression models. Therefore, even though in some cases the mean gains are quite similar across testing cycles, such as for the regression model in grade 2 reading, the differences are maintained for the norm-referenced model, under which most students were evaluated.

Table 13
Mean NCE Gains by Model, Subject Matter, Grade, and Testing Cycle

Subject Matter	Grade	Testing Cycle	Norm-Referenced n	Norm-Referenced Mean Gain	Comparison Group n	Comparison Group Mean Gain	Regression n	Regression Mean Gain
Reading	2	Full year	30,288	2.9	188	-1.9	5,271	-1.1
		Fall-Spr.	147,144	8.4	22	8.5	87	-3.8
	6	Full year	30,904	3.3	85	1.5	3,792	.9
		Fall-Spr.	100,976	5.8	97	2.3	-	-
Math	2	Full year	13,580	4.2	227	- .2	1,815	5.8
		Fall-Spr.	55,119	9.7	17	6.3	96	1.7
	6	Full year	16,800	4.1	211	7.8	1,851	3.6
		Fall-Spr.	58,170	7.3	341	.8	138	4.0

Note: These tabulations were generated from the project vector file created by RMC from the Title I State Performance Reports for 1979-80.

Confounding by Test and Level

Tables 14 and 15 show the mean gains broken out by grade, test, test level, and testing cycle for reading and math respectively. Results are shown only for tests where the gains in each subgroup defined by level and testing cycle are based on at least 100 students.

In all four instances, the same pattern is evident for the California Achievement Test (CAT): there are large gain differences between testing cycles for projects that tested in-level and the differences are substantially smaller for projects that tested out-of-level. It should be noted that more students were tested with the CAT than with any other test. For example, in grade 2 reading, about 33% of the Title I students on the project vector file were tested with the CAT. For grade 2 reading at least, the same pattern is also found for the Metropolitan Achievement Test (MAT) and the Stanford Achievement Test (SAT).

For the CAT, at least, it appears that testing in-level or out-of-level does not affect the gains in a fall-spring testing cycle. For a full-year testing cycle, on the other hand, in-level testing appears to depress the gains. However, it is not clear from the instructions for completing the project vector section of the State Performance Report whether the level refers to the posttest or pretest. We have no information on the project vector file as to the level of the pretest, or in fact whether the same test battery had been used for the pretest. Therefore, it is difficult to identify any specific pattern of testing that leads to the results shown in Tables 14 and 15.

Conclusion

It would be premature to come to any conclusion at this time since we have just begun our examination of this issue. It does appear that while the pattern of differences in gains across testing cycles is pervasive, a good proportion of the total difference at a given grade

level and subject may be attributed to a few SEAs. Unfortunately, for the one SEA that appears to manifest the largest differences (California), we have only a fragmentary nonrepresentative sample of projects.

Table 14
Reading Achievement Statistics for Students in Projects that Used the Norm-Referenced Model by Testing Cycle, Test, and Level

			Full Year		Fall-Spring		
Grade	Test	Level	n	Mean Gain	n	Mean Gain	Difference
2	CAT	IN	5,567	.1	15,160	7.9	7.8
		OUT	2,279	5.1	15,459	6.8	1.7
	GATES	IN	699	6.4	8,849	7.0	.6
		OUT	122	11.5	3,218	8.6	-2.9
	MAT	IN	1,038	4.8	4,873	8.5	3.7
		OUT	509	3.2	3,990	4.9	1.7
	SAT	IN	2,237	.3	3,357	8.6	8.3
		OUT	806	4.7	2,318	6.5	1.8
6	CAT	IN	3,305	4.1	10,059	6.1	2.0
		OUT	1,118	5.3	10,877	4.8	- .5
	GATES	IN	557	1.6	5,889	9.1	7.5
		OUT	127	10.7	1,908	5.4	-5.2
	MAT	IN	605	5.1	4,248	4.9	- .2
		OUT	481	5.9	1,970	6.4	.5
	SRA	IN	1,985	1.1	4,180	3.3	2.2
		OUT	276	1.3	2,113	3.7	2.4
	SAT	IN	1,727	3.4	2,326	4.2	1.8
		OUT	136	2.8	1,187	4.4	1.6

Note: Results are presented for tests where the gains in each of the four groups defined by level and testing cycle are based on at least 100 students. Tabulations were generated from the project vector file created by RMC from the Title I State Performance Reports for 1979-80.

Table 15
Math Achievement Statistics for Students in Projects that Used the Norm-Referenced Model by Testing Cycle, Test, and Level

			Full Year		Fall-Spring		
Grade	Test	Level	n	Mean Gain	n	Mean Gain	Difference
2	CAT	IN	3,388	3.3	6,303	10.3	7.0
		OUT	609	5.8	4,920	9.4	3.6
	SAT	IN	563	.6	1,074	7.2	6.6
		OUT	282	-3.3	1,160	6.0	9.3
6	CAT	IN	1,719	4.2	5,993	8.4	4.2
		OUT	712	6.9	5,786	8.1	1.2
	SRA	IN	1,520	2.7	2,493	3.7	1.0
		OUT	126	3.7	1,140	5.2	1.5

Note: Results presented for tests where the gains in each of the four groups defined by level and testing cycle are based on at least 100 students. Tabulations were generated from the project vector file created by RMC from the Title I State Performance Reports for 1979-80.

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